FINAL REPORT

MONITORING OF IN-FIELD MICROENVIRONMENT FOR DISEASE FORECASTING AND PREVENTION

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CANADA-SASKATCHEWAN AGRI-FOOD INNOVATION FUND
and
SASKATCHEWAN SEED POTATO GROWERS ASSOCIATION, INC.

INFRASTRUCTURE AGREEMENT

MONITORING OF IN-FIELD MICROENVIRONMENT FOR DISEASE PREDICTION AND PREVENTION IN POTATOES

A. EXECUTIVE SUMMARY

In 1998 there was an industry wide effort to fulfill this project's objectives, which were:

a) to establish a network of low-maintenance, environmental monitoring systems in potato fields in the key growing regions in Saskatchewan;

b) to use the environmental data collected by the monitoring network to produce timely disease prediction information; and

c) to make the resulting disease prediction information and appropriate management information available to Saskatchewan's potato industry via a recorded phone message system and via Saskatchewan Agriculture and Food's web page.

In conjunction with Spudco and a private grower, a network of 11 weather stations were established in potato-growing areas of Saskatchewan. Twice weekly data was collected from the weather stations and, using a computerized disease prediction program, the potential risk of a late blight outbreak occurring in a given area was analysed. The results were then broadcast to seed potato growers through a 1-800 number and through the SSPGA web site. Special "alerts" were faxed to growers.

As 1998 was a start-up year, there were several areas of concern which arose during the year. However, the network was put into place, data was collected and invaluable experience gained in its operation. Planning has already begun for the 1999 year, including the addition of two and possibly three more weather stations throughout the province. We are confident we will be able to expand coverage to all potato growing areas in Saskatchewan within the next few years.

B. TECHNICAL REPORT

1. Background and Objectives

Late blight is a fungal disease of potatoes which can arrive on weather systems. If unchecked, it is a devastating disease, killing potato crops within days of infestation. The incidence of late blight is increasing in areas outside of Saskatchewan. Severe outbreaks occurred in Manitoba, North Dakota, and Idaho. Smaller, more isolated outbreaks occurred in parts of Montana and Alberta. We did not go untouched either, with an outbreak in one area of the province.

Fungicide applications can prevent or control an infestation of late blight, however each application is very costly for the producer and multiple applications are the norm. Growers who are provided with timely information about potential risks of late blight infestations can adjust

their spray schedules to the optimum rotation for adequate protection at the least cost to them.

The objectives of this project were to purchase weather stations and supporting computer software to provide a network of environmental monitoring in key potato growing areas of the province. With the data collected, personnel would provide analysis through a disease risk computer program and distribute the results to potato growers in the province.

2. Project activities and achievements

Once final approval of the project was received, we did a thorough investigation of the type of equipment suitable to our needs. After careful consideration, and in consultation with others who decided to partner in the project, it was decided that a system of stations linked to a central computer system by cellular telephones with modems was the best method given the areas we were trying to cover.

Partners to the project were found in Spudco and Lake Diefenbaker Potato Corporation. Spudco purchased three weather stations and Lake Diefenbaker purchased two, giving a total of 11 throughout the province. Spudco offered the services of their 1-800 number for the Blight Line. The provincial plant pathologist with Saskatchewan Agriculture and Food undertook to investigate the appropriate computer software, arrange for its purchase, be responsible for collecting the data and provide the disease risk analysis. The SSPGA undertook to distribute the results to growers, update the Blight Hotline, post the information on the internet and lobby the chemical industry for support of the project. The SSPGA also contracted with a potato expert to look after the installation and maintenance of the stations.

3. Results and Conclusions

Although we fulfilled the objectives of the project, the first year of operation was not without its problems. Ideally, stations should be in the field and operating before the plants emerge from the ground. The early spring and late delivery of some of the equipment prevented us from getting the stations up and running on time. This did affect the quality of the disease risk analysis, however, everyone was aware of the problem and made appropriate adjustments in their analysis. As well, changes in personnel in Sask. Ag & Food during the summer created some problems in the analysis part of the program. We would like to acknowledge those in the Crop Protection Lab who took up the challenge of working with an unfamiliar program at a busy time of year, and tried their best to make the most of a difficult situation.

In all, eleven stations were placed throughout Saskatchewan. The six stations purchased by the SSPGA were stationed at Yorkton, the Qu'appelle Valley, Nipawin, Carrot River and two in the Outlook/Broderick area. Spudco placed their three stations at Riverhurst (2) and Outlook, and Lake Diefenbaker placed their two in the Lucky Lake/Birsay area.

We were able to attract some support from the chemical companies for the project. The cost of most of the SSPGA's share of maintenance and operation of the system was covered through their donations. We will be lobbying the companies again for this year's operations.

At a recent debriefing and planning meeting for the project, everyone agreed that, although there were problems encountered last year, they were encouraged by what information we did gather. With all our stations in place and with early planning, we are looking forward to a much more successful year. At least two, and possibly three, more stations will be added to the network this year. In addition, we will be investigating sharing of data with Environment Canada in hopes of reaching a broader area where we do not have our own weather stations.

4. Information Sharing

Once we received the results of the data analysis from Sask Ag & Food, the information was distributed to the growers through the Blight Hotline number. The results were also posted on the SSPGA's website (http://www3.sk.sympatico.ca/sspga) and, if needed, a Blight Alert was sent to growers via facsimile (samples are attached for your information). Raw data collected from the weather stations has been provided to the Plant Sciences Department, Horticulture Division, University of Saskatchewan, for their use in further plant disease research.

C. PERSONNEL

The SSPGA hired Bill King for the installation, programming, maintenance and teardown of the weather stations. Although most of his consulting fee was paid for from SSPGA funds, or those solicited from the chemical companies for operating expenses, his initial training time and some of the installations were charged as an expense to the AFIF fund. This involved three days in Edmonton (two days of training and one day of travel) for the training session with Campbell Scientific. The session was also attended by a Spudco employee and Dr. Michael Celetti, formerly of Sask. Ag and Food.

D. EQUIPMENT

No.	EQUIPMENT	$/Unit	Total $
6	ENC 12/14 Fibreglass Enclosure 12" x 14" w/mounts	$324.00	$ 1,944.00
6	CR10X Measurement & Control Module w/128K RAM Memory & Wiring Panel	$1,746.00	$ 10,476.00
6	CH12R Power Supply Regulator 2 VDC, 1.5 amp	$243.00	$ 1,458.00
6	BP12PS Rechargeable Lead Acid Battery, 12V	$108.00	$ 648.00
6	MSX20 Solar Panel, 20 watt, 12 volt w/mount	$486.00	$ 2,916.00
6	COM100 Motorola Cellular Connection Transceiver w/RJ11 Jack & switching circuits	$864.00	$ 5,184.00
6	Cellular Telephone Omnidirectional Antenna	$72.00	$ 432.00
6	COM 200 Telephone modem - 9600 Baud	$639.00	$ 3,834.00
1	SC929 CSI 9 Pin to RS232 9 Pin Interface Cable	$155.00	$ 155.00
1	PC208W Datalogger Support Software	$680.00	$ 680.00
6	CM10 Tripod & Grounding Kit	$477.00	$ 2,862.00
6	CS500-U Relative Humidity & Air Temperature Probe	$495.00	$ 2,970.00
6	41301-5 RM Young Radiation Shield	$153.00	$ 918.00
6	237 Wetness Sensing Grid	$81.00	$ 486.00
6	TE525M Tipping Bucket Metric Rain Guage	$378.00	$ 2,268.00
	TOTAL		$ 37,231.00

D. INNOVATION FUND ACKNOWLEDGEMENT

Acknowledgement of the Agri-Food Innovation Fund support has been noted at the SSPGA's semi-annual and annual meetings and at SIDC/SPUDCO/SSPGA Potato Days, in print in our Spud Notes newsletter, on our web-site, on the Blight Alert faxes, and verbally on the Blight Hotline.